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June 24, 2019

Marlene Dortch, Secretary
Federal Communications Commission
445 Street, SW
Washington, DC 20554

via ECFS

Re: Notice of Oral *ex Parte* Presentations: IB Docket No. 18-86 (In the Matter of Streamlining Licensing Procedures for Small Satellites)

Dear Ms. Dortch:

On June 20, 2019, Andrew Roy and Gregory Baker of Aviation Spectrum Resources, Inc. ("ASRI"); Edward A. Yorkgitis, Jr., of Kelley, Drye & Warren, LLP, counsel for ASRI; Ramsey Abid of Collins Aerospace; and Christopher Sellen of SITAONAIR (collectively, the "Aviation Representatives") met with Will Adams, advisor to Commissioner Brendan Carr, and with William Davenport, advisor to Commissioner Geoffrey Starks. The purpose of the meetings was to discuss the aviation industry's current uses of the band 136-137 MHz for critical VHF data communications in the United States and internationally. The Aviation Representatives highlighted the aviation industry's concerns that any actions facilitating small satellite use in the 137-138 MHz band be considered only if effective methods of mitigating interference to adjacent band aviation safety data communications are put in place both domestically and globally.

The Aviation Representatives described the increasing utilization of the 136-137 MHz band for the Very High Frequency Data Link Mode 2 ("VDLM2") system which supports applications critical to aviation safety and efficiency of operations. VDLM2 is a digital, air-to-ground datalink technology providing connectivity for aircraft to send and receive Air Traffic Control ("ATC") and Airline Operational Control ("AOC") communications messages. VDLM2 is a core capability of the Federal Aviation Administration's ("FAA's") Data Comm program that provides Air Traffic Services ("ATS") such as Controller-Pilot Data Link Communications ("CPDLC") which supplements, and increasingly replaces, voice communications with digital text messages. The Aviation Representatives provided information on the extensive, and growing, use of Data Comm program in the United States today, and the substantial benefits that Data Comm program provides to the public, as well as users of the National Airspace System

("NAS"), including improved efficiency, improved safety, reduction of flight delays, reduced CO2 emissions, and lower transportation costs. They also described the extent to which VDLM2 is deployed internationally and planned expansions both to improve domestic and worldwide VDLM2 coverage and to implement CPDLC services in countries outside the United States.

The Aviation Representatives explained that VDLM2 networks uses 136.975 MHz (136.9625-136.9875 MHz) for its Common Signaling Channel ("CSC"). This channel is designated globally in the International Civil Aviation Organization ("ICAO") Standards and Recommended Practices ("SARPS"), pursuant to decision in international fora several decades ago and a standardized architecture defined globally by ICAO. The CSC is critical to the VDLM2 network, as it is the unique channel required to access other dedicated provider frequencies and is also the emergency fallback frequency should an aircraft lose coverage.

They explained that the Commission should carefully consider the potential for out-of-band emissions ("OOBE") from small satellites into the CSC, causing harmful interference to both ground and the aircraft stations using VDLM2. If a VDLM2 station experiences an elevated noise floor due to OOBE, there will be gaps in coverage, and the serviceable range in which the aircraft can communicate through the datalink with air traffic control facilities and airline operational centers may be reduced, leading to delays or even outright failures in transmission of important ATC or AOC messages. Due to the concern that small satellite frequency assignments close to the band will cause harmful interference to the CSC, the Aviation Representatives urged the Commission to adopt a guard band of at least one channel (25 kHz) at the bottom of the 137-138 MHz band (i.e., at 137.000 to 137.025), with the first small satellite channel centered at 137.0375 MHz (i.e., occupying 137.025-137.050 MHz). Further, if small satellites' frequency oscillator drifts and other fault conditions are not properly regulated and monitored, the potential for harmful interference from OOBE emissions would increase. The potential for aggregate interference from satellites is of particular concern if steps are not taken to protect the CSC.

The Aviation Representatives also noted that both aviation and satellites transmissions are international in nature in and around 137 MHz, which underscores the need for the Commission to consider any global implications. As of early this year, questions have arisen under Agenda Item 1.7 of the upcoming World Radiocommunication Conference regarding aviation protection below 137 MHz. The Aviation Representatives noted that there have been no approved adjacent band compatibility studies conducted within the relevant Working Parties of the International Telecommunication Union Radiocommunication Sector ("ITU-R") to ensure that VDLM2 would not be impacted by regulation changes for small satellite usage of the 137-138 MHz band. The Aviation Representatives urged the Commission to support a U.S. position

of "no change" and promoting the ICAO protection criteria until protection levels can be thoroughly agreed within the ITU-R.

A copy of the written presentation materials used in both meetings is attached.

Pursuant to Section 1.1206(b) of the Commission's rules, this letter is being filed electronically.

Respectfully submitted,

Edward A. Yorkgitis, Jr.
Counsel for Aviation Spectrum Resources, Inc.

EAY/am

Attachment

cc: Will Adams
William Davenport

Small Satellites and VHF Datalink Mode 2

Aviation Spectrum Resources, Inc. (ASRI)
Collins Aerospace
Société Internationale de Télécommunications Aéronautiques (SITAONAIR)

Prepared for Commissioner Starks's Office and Commissioner Carr's Office
June 20th 2019

Overview

- Introductions
- VHF Data Link Mode 2 (VDLM2) System
- US Datalink Operations
- International VDLM2 Coverage
- Aviation Concerns with Small Satellites
  - WRC-19 Agenda Item 1.7
  - Docket 18-86
- Commission Actions to Protect Aviation

VHF Data Link Mode 2 System

- VDLM2 is an internationally standardized air-ground datalink operated between 136-137 MHz
  - Supports safety and regulatory of flight messages
  - Equipped on majority of medium/large commercial aircraft for operational control messages
- United States is leading the world on implementation of Air Traffic Services over VDLM2
- ICAO specified common signaling frequency on 136.975 MHz worldwide
  - Required everywhere there is VDLM2 coverage
  - Initial route to log into network and emergency fallback frequency

US Operations

FAA Data Comm Program

- Provides data communications services between pilots and air traffic controllers, supplementing existing voice communications capabilities
- Provides a data link between ground automation systems and flight deck avionics for air traffic control (ATC) clearances, instructions, traffic flow management, and flight crew requests
- Controllers will be able to deliver instructions with a push of a button and without the need to utilize voice frequencies
- Enables the transmission of complex instructions that can be quickly and correctly loaded into an aircraft's flight management system, upon acceptance by the pilot
- Enables NextGen Initiatives and Trajectory-Based Operations

Data Comm Metrics

13 US Air Carriers
(Part 121)

53 Non-US Air Carriers
(Part 129)

1,600+ Business Aviation Operators
(Parts 91, 91K, 135)

62 Airports

58 Aircraft Types

Over 5,900 Equipped Aircraft

7.8M CPDLC Messages Sent
2018

Data Comm Tower Benefits 2018

Improve re-routing around weather and congestion

Throughput/Efficiency

531,000+ minutes of reduced delay

Reduce Communication time between controllers & pilots

Controller Pilot/Efficiency

641,000+ minutes of communication time saved

Increase flexibility and accommodation of user requests

Environmental

4.7M kgs of CO_2 emissions prevented

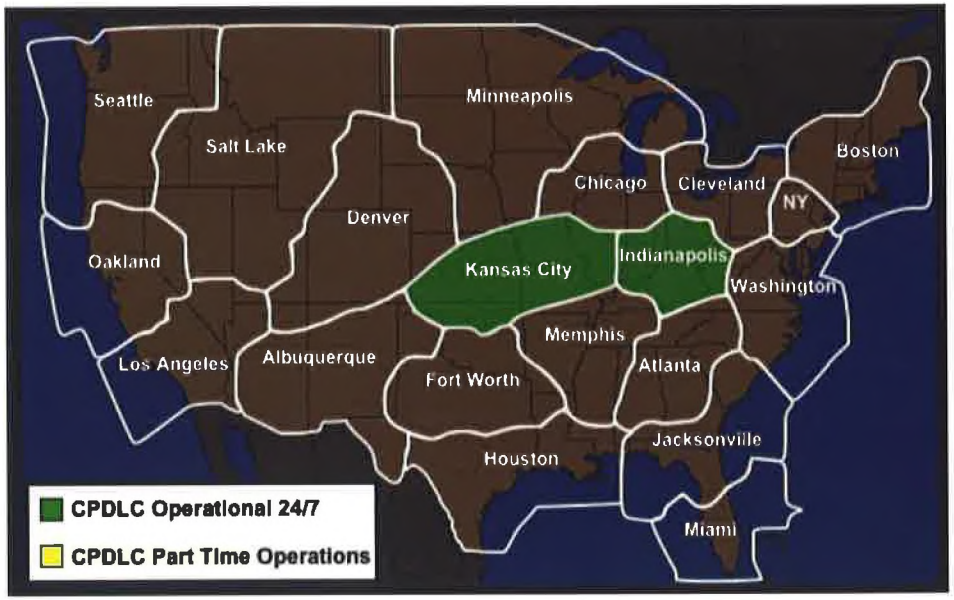
Enable NextGen Initiatives & Trajectory-Based Operations

Safety

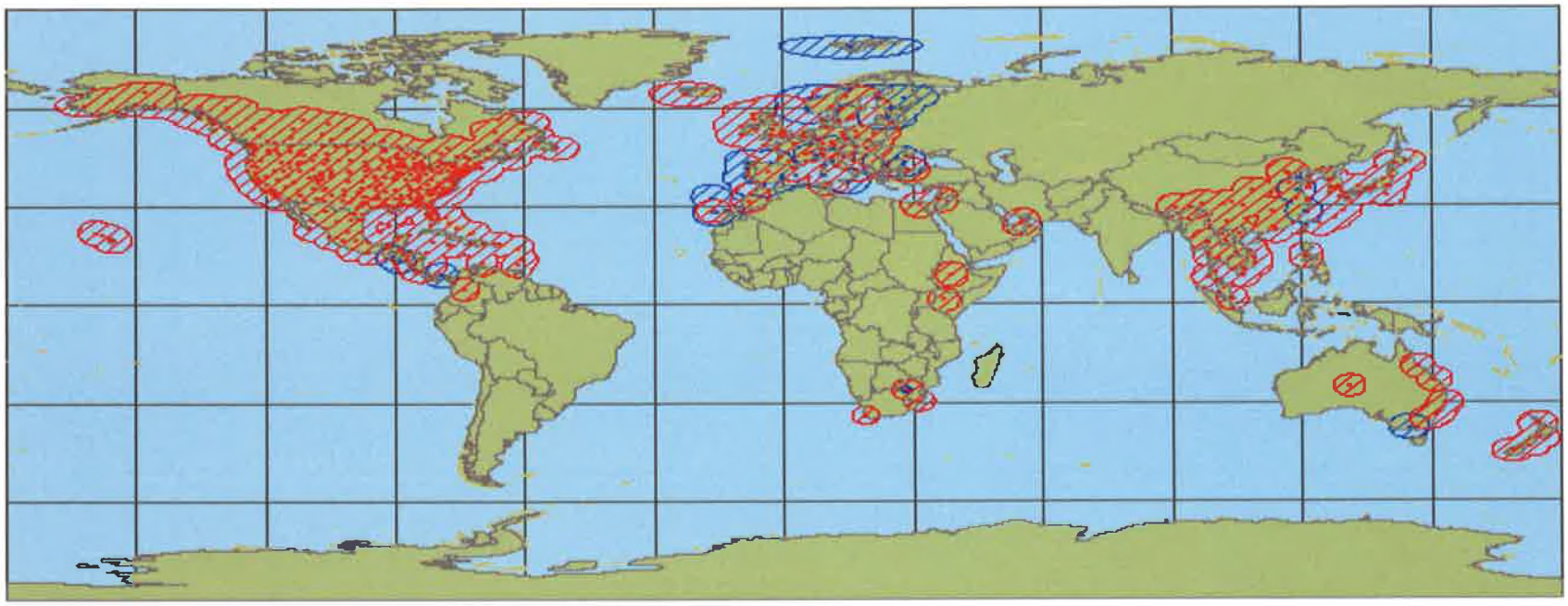
33,800+ readback errors avoided

Data Comm En Route

- En route services projected to deliver significantly more benefits than tower
- Air-ground network supports tower and en route services
- En route services currently in early operations
  - Kansas City & Indianapolis airspace
  - Expected national deployment by 2021



WORLDVIEW: COLLINS VDLM2 COVERAGE



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0 1,0002,000 4,000
Nautical Miles

Notes:
The map projection is Geographic and is for representation only. Not to scale.
Terrain obstructions are not considered.

Legend:
Operational
Planned

GLOBALink VDL - World
Operational and Planned Coverage

Drawn By:	Filename:	Effective Date:
bsisas	world planned vdl.mxd	March 23, 2018

Rockwell Collins
Building trust every day

SITAONAIR - Global VDL Coverage

WRC-19 Agenda Item 1.7/Docket 18-86

- Aviation concerned about harmful interference from unwanted emissions by small satellites operations in 137-138 MHz into adjacent AM(R)S allocation impacting VDLM2
  - 136.975 MHz is essential for VDLM2 operations
  - Emergency fallback frequency, required everywhere there is VDL coverage
- No international agreement on protection levels
  - VDLM2 needs protection worldwide, values agreed in ICAO but not ITU-R
- Mitigations available for small satellites
  - Filtering, Guard band

The Commission Should Ensure Protection of VDLM2

- Domestic rules and international agreements facilitating small satellites/non-geostationary short duration satellites use in the 137-138 MHz band should require effective methods of mitigating potential harmful interference to adjacent band aviation safety VHF data communications
- Domestically, as a first step, the Commission should adopt in its *Small Satellite* proceeding a guard band of at least one channel (25 kHz) at the bottom of the 137-138 MHz band (i.e., at 137.000 to 137.025 MHz)
  - The fault conditions of small satellites should be properly regulated and monitored
- Internationally, protection requires U.S. leadership
  - The Commission should support a U.S. position promoting ICAO protection criteria until protection levels can be thoroughly agreed within ITU-R
    - FAA studies submitted to ITU-R show harmful interference unless mitigations are in place

Questions?